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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/811,081	03/16/2001	Thomas Mossberg	5455P001	6284

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EXAMINER
AMARI, ALESSANDRO V

ART UNIT	PAPER NUMBER
2872	

DATE MAILED: 04/02/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/811,081	MOSSBERG, THOMAS	
	Examiner	Art Unit	
	Alessandro V. Amari	2872	

-- The MAILING DATE of this communication app ars on th cover sh et with the correspondenc address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *22 January 2003* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-105* is/are pending in the application.

4a) Of the above claim(s) *1-11,26,33,36-44 and 56-105* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *12-25,34,35 and 45-55* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2,7 .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other:

DETAILED ACTION

Election/Restrictions

1. Applicant's election of Group I, Species 2 in Paper No. 9 is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)).

Claim Rejections - 35 USC § 112

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claims 17 and 55 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

Regarding claims 17 and 55, the phrase, "a conjugate Fourier transform $E_i^*(\omega)$ of a designed temporal waveform $E_i(t)$" is not defined in the specification in that the applicant does not show how to obtain the conjugate Fourier transform or its function or effect, in that (see page 17 of 34, lines 1-8 of specification), the input pulse cannot by itself determine the transfer function of the hologram.

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 17 and 55 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding claims 17 and 55, the phrase, "a conjugate Fourier transform $E_i^*(\omega)$ of a designed temporal waveform $E_i(t)$" is indefinite because any hologram has a programmed temporal transfer function comprised of a designed temporal waveform and since the designed temporal waveform is not defined.

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. Claims 12-20, 23-25, 34-35 and 45-55 are rejected under 35 U.S.C. 102(b) as being anticipated by George et al. U.S. Patent 4,834,474.

In regard to claims 12, 34 and 45, George et al teaches (see Figures 1b, 2b and 4b) a volume hologram comprising a plurality of diffractive elements (12) exhibiting a positional variation in at least one of amplitude, optical separation, and spatial phase over some portion of the thickness of the volume, the volume hologram interacting with an input optical signal having a first spatial wavefront and a first temporal waveform to produce an output optical signal having a second spatial wavefront and a second temporal waveform, wherein the first and second spatial wavefronts differ in at least one of spatial wavefront shape and output direction, and the first temporal waveform differs

from the second temporal waveform or a plurality of output optical signals, each output optical signal having a spatial wavefront that differs from the respective spatial wavefronts of all other output optical signals, each output optical signal having a respective temporal waveform, wherein at least two of the output optical signals have temporal waveforms that differ from one another; and a plurality of output ports configured to accept and transmit the plurality of output optical pulses as described in column 2, lines 47-65 and column 5, lines 22-41.

Regarding claims 13, 35 and 49, George et al teaches that the input optical signal comprises an optical pulse as described in the abstract and column 5, lines 22-41.

Regarding claims 14 and 15, George et al teaches the first and second spatial wavefronts originate from an input optical waveguide and converge to an output optical waveguide as described in column 10, lines 17-27.

Regarding claims 16 and 54, George et al teaches the volume hologram is an optical waveform cross-correlator as described in column 2, lines 47-65 and column 5, lines 22-41.

Regarding claims 17 and 55, George et al teaches comprising a programmed temporal transfer function, comprising a conjugate Fourier transform $E_i^*(\omega)$ of a designed temporal waveform $E_i(t)$ as described in column 5, lines 22-41 and column 6, lines 30-55.

Regarding claim 18, George et al teaches that each of the diffractive elements has a spherical contour and a center of curvature as shown in Figures 1b, 2b and 4b.

Regarding claim 19, George et al teaches that the centers of curvature of a plurality of the diffractive elements are coincident as shown in Figures 1b, 2b and 4b.

Regarding claim 20, George et al teaches the input optical signal originates from an input waveguide, and wherein the output optical signal converges to an output waveguide, with the respective input and output waveguides located at respective conjugate image points of the plurality of the diffractive elements whose centers of curvature are coincident as described in column 6, lines 30-55 and column 10, lines 17-27 and as shown in Figure 4b. The conjugate image points are broadly interpreted as being two sources which are equally well imaged at two different points as for example, the points shown in Figure 4b (incident pulse and diffracted pulse). Since the incident pulse and the diffracted pulse are equally well imaged accordingly the two are interpreted as respective conjugate image points.

Regarding claim 23, George et al teaches that the propagation direction of the input optical signal is not collinear to the propagation direction of the output optical signal as shown in Figures 1b, 2b and 4b.

Regarding claim 24, George et al teaches all diffractive elements have an elliptical contour, with each diffractive element having a first focus and a second focus, and wherein a plurality of the respective first foci of the diffractive elements coincide, and a plurality of the respective second foci of the diffractive elements coincide as shown in Figures 1b, 2b and 4b.

Regarding claim 25, George et al teaches that the input optical signal originates from an input waveguide and the output optical signal converges to an output

waveguide, and where the respective input and output waveguides are located at the respective foci of the diffractive elements whose respective first foci coincide, and whose respective second foci coincide as described in column 6, lines 30-55 and column 10, lines 17-27.

Regarding claims 46 and 47, George et al teaches that the volume hologram further comprises spatial transformation information and the diffracted optical signal is spatially transformed as described in column 5, lines 22-41.

Regarding claim 48, George et al teaches that the input optical signal has a first direction of propagation and the diffracted optical signal has a second direction of propagation, and where the first direction of propagation is not collinear to the second direction of propagation as shown in Figures 1b, 2b and 4b.

Regarding claims 50, 51, 52 and 53, George et al teaches that the volume hologram further comprises spectral and spatial transformation information and the diffracted optical signal is spectrally and spatially transformed as described in column 7, lines 52-67.

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

9. Claims 21 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over George et al U.S. Patent 4,834,474.

Regarding claims 21 and 22, George et al teaches that the first spatial wavefront originates from an input optical waveguide and the second spatial wavefront converges to an output optical waveguide as described in column 6, lines 30-55 and column 10, lines 17-27, but does not teach that the input waveguide is separated from the output waveguide by a distance equal to or less than about 5000 microns or that the input waveguide is separated from the output waveguide by a distance between about 5000 microns and about 25 microns.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to separate the input and output waveguides by the micron ranges claimed, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. One would have been motivated to fix the separation distances for the purpose of focusing the input and output waveforms on the waveguides.

Conclusion

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Babbitt et al U.S. Patent 5,812,318 shows a volume hologram comprising a plurality of diffractive elements which tailor the spatio-temporal dispersion of the optical pulses for a system as shown in Figure 2B and as described in column 9, lines 53-56, column 11, lines 10-30, column 10, lines 60-67 and column 22, lines 2-36.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alessandro V. Amari whose telephone number is (703)

306-0533. The examiner can normally be reached on Monday-Friday 8:00 AM to 5:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Cassandra Spyrou can be reached on (703) 308-1687. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9318 for regular communications and (703) 872-9319 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

ava qvq
March 27, 2003

MARK A. ROBINSON
PRIMARY EXAMINER